



INSTALLATION, START-UP AND OPERATION OF LOADMATCH® SYSTEMS





LoadMatch® Systems

consist of a one pipe primary loop (or loops) and decoupled terminal unit circuits.

FIGURE 1

ASHRAE describes this as a series circuit with compound pumping*.

Decoupled is defined as “separated, disconnected, or divergent”. In hydronic systems, decoupling is the act of separating the **effects** of the flows in two piping loops that share a common pipe, often called a decoupler. For example, the secondary circuit in a primary/sec-

ondary system is **decoupled** from the primary loop such that the flow in the primary does not cause any flow in the secondary loop unless the secondary circulator is operated. The advantage of decoupling in a LoadMatch system is the ability to independently control flows in the terminal units without the need for control valves or balancing valves.

FIGURE 2

Decoupling is illustrated below. Primary flow entering the tee at point A can follow one or two paths to get to point B. Since water always follows

the path of least resistance, all the water will follow the path through the decoupler as long as its pressure drop is zero.

Due to the hydraulic separation caused by decoupling, purging and venting the air from LoadMatch systems differs from typical two and four pipe systems using control valves. Following are descriptions of the best ways to install and purge LoadMatch piping networks.

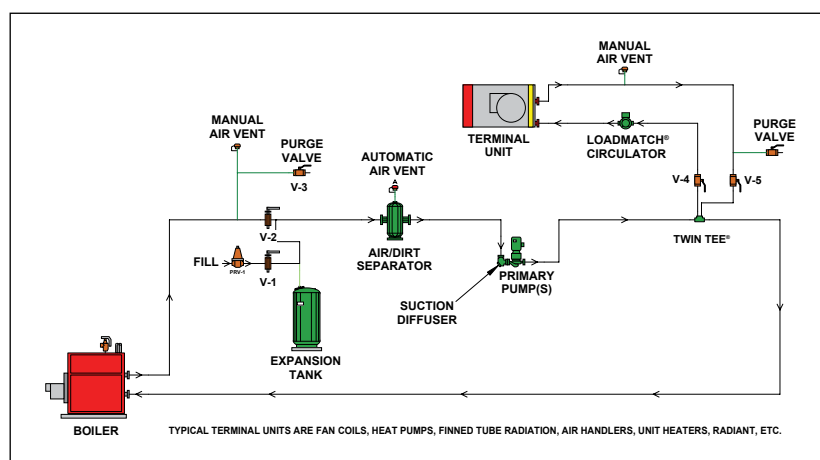


Figure 1

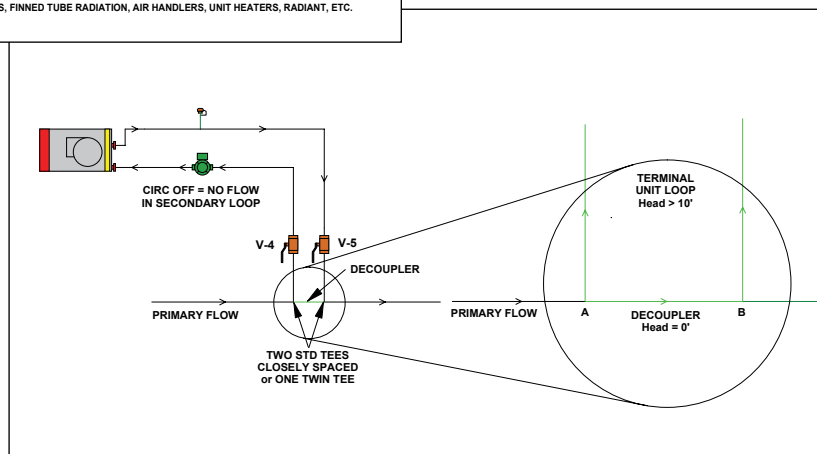


Figure 2



LoadMatch® Circulator and Orientation

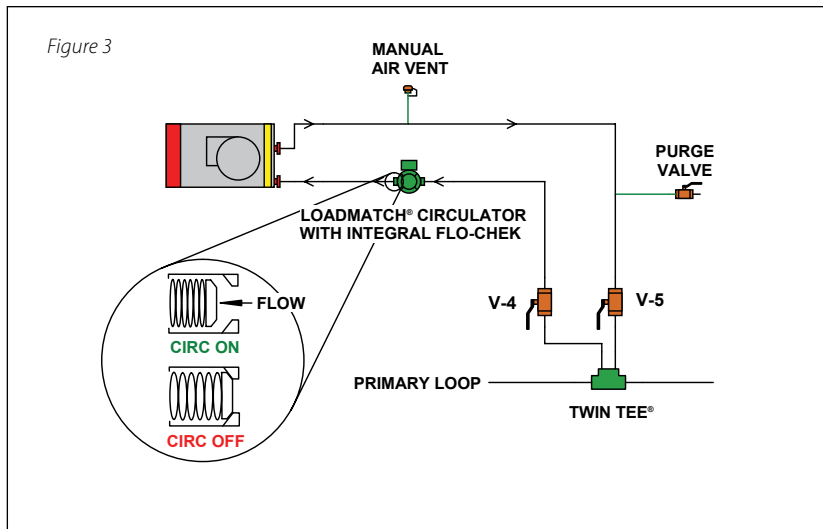
FIGURE 3

The best location for a LoadMatch circulator in the LoadMatch loop is between the primary loop and the inlet side of the terminal unit.

FIGURE 4

LoadMatch circulators are supplied with spring loaded flow checks, located in the discharge, that only allow flow in one direction.

Taco LoadMatch circulators require system fluid, typically water or antifreeze solution, for cooling and lubricating. They must be purged and primed with clean fluid and not allowed to run dry.



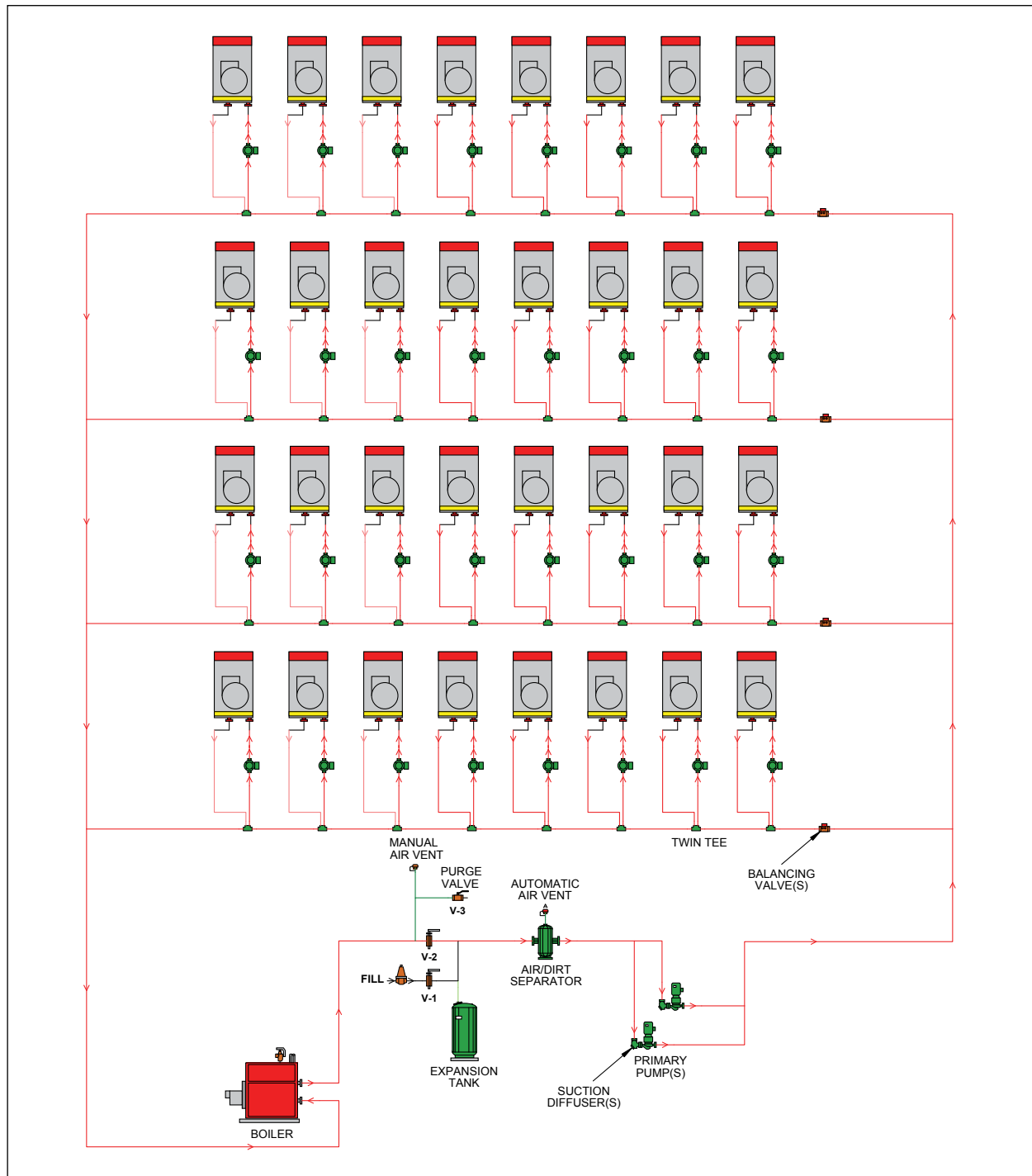
As a result, circulators located after the purge valve, usually on the outlet or return side of the terminal unit, have the potential to trap air in the circulator because the flo-chek prevents water from flowing backwards through the circulator to the vent to remove the air in the return line. Circulators must be installed upstream of the purge valve / manual air vent to avoid trapping air at the impellers.

All LoadMatch circulators should be installed so the motor shaft is parallel to the ground and

the junction box is not below the motor. Avoid installing a LoadMatch circulator with the motor shaft vertical and the motor above the pipe/volute as air binding in the cartridge may prevent the cartridge from being adequately cooled and lubricated.

Purge valves and air vents are ideally located on the outlet side of the terminal unit.

Service valves (V-4 and V-5) should be close to the primary loop and close enough together to handle simultaneously, thus avoiding opening / closing the wrong valve(s) during purge process.



Complete LoadMatch System



Twin Tee® Location and Orientation

Twin Tees should be piped in the primary loop to minimize the length and complexity of the LoadMatch loops. This will simplify the venting and purging of the LoadMatch loops during startup.

To reduce the possibility of air and dirt entering the LoadMatch loops from the primary loop, the Twin Tees should be oriented with the branch connections on the side as shown below.

FIGURE 5

Twin Tees can be installed with flow going through them in either direction. Branch connections are

also independent of flow direction. Either outlet can be used for supply or return.

There is no minimum distance required between multiple Twin Tees installed in the same loop. Due to the relatively high flow rate in the primary loop compared to the LoadMatch loop, there is little chance the flows in one Twin Tee will affect another.

It is acceptable to connect more than one terminal unit to a Twin Tee provided the piping can be kept relatively short and excessive fittings avoided. When in doubt, dedicate a separate Twin Tee to each terminal unit.



Figure 5

FIGURE 6

In lieu of a Twin Tee, two standard tee fittings can be used to connect any LoadMatch loop to the primary loop. In this case, the tees should be joined end to end with a close or space coupling so they are as close together as possible. In this arrangement, the upstream tee must be the supply to the terminal unit and the downstream tee the return.

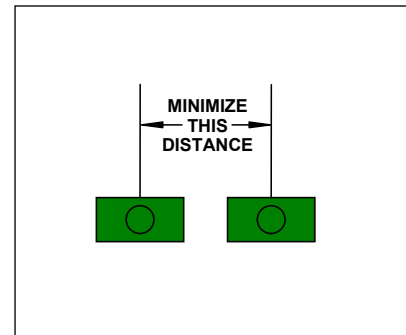


Figure 6



Purging and Cleaning Primary Loop(s)

Purge and clean primary loop(s) first with valves on LoadMatch loops closed and all pumps and Load-Match circulators OFF.

To prevent pipe shavings and other debris from fouling the flo-cheks in the LoadMatch circs and/or coils in the terminal units (particularly heat pumps), the primary loop should be thoroughly cleaned and flushed before opening valves on LoadMatch loops. This is consistent with industry standard heat pump system purging and cleaning processes.

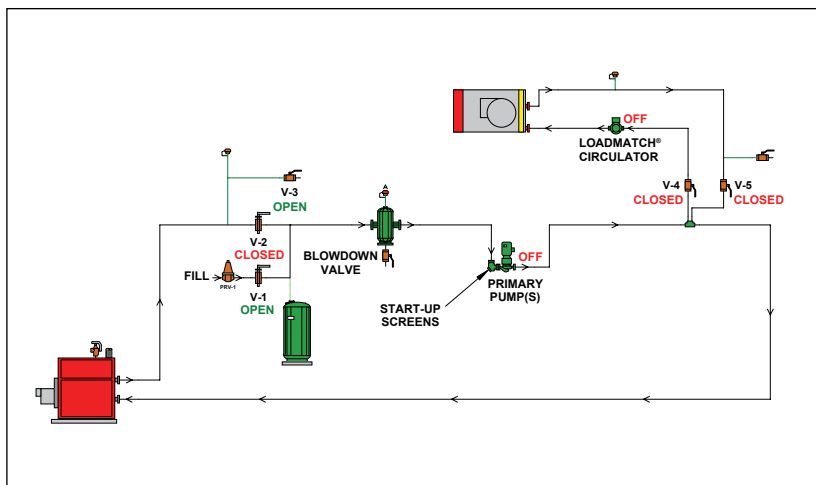


Figure 7

FIGURE 7

Purging the primary loop is best accomplished using higher city water pressure instead of the pressure created by the primary pump(s). Close primary loop valve V-2, and open fill valve V-1 and purge valve V-3. City water pressure can now purge the entire loop out through V-3 without primary pump(s) running. Other air vents located throughout the piping network should also be utilized to eliminate isolated air pockets.

Once purged, the primary pump(s) can be started and the primary loop cleaned. Primary pump(s) should be operated until start up screens in suction diffusers no longer show signs of pipe shavings or debris and water blown down from air/dirt separator is clean. In most cases, primary pump(s) may need to run for 24 hours or more and screens cleaned repeatedly.

If there are multiple boilers or chillers, make sure to alternate purging of boiler / chiller modules to be sure each is free of air and debris before leaving them open to the rest of the system.

Once the primary loop has been purged and cleaned, a similar process can be executed for the LoadMatch secondary loops.



Purging and Cleaning LoadMatch® Loop(s)

City water pressure should also be used to purge the LoadMatch loops instead of the pressure created by the LoadMatch circulators. Primary pump(s) should be OFF, V-2 and V-3 closed and main fill valve V-1 should be open to maintain city water pressure in the clean primary loop.

FIGURE 8

To purge LoadMatch loop, open supply valve to the terminal unit V-4 and close return valve V-5. Opening the manual air vent / purge valve will allow city water pressure to purge air from the entire supply pipe, LoadMatch circulator and terminal unit.

To purge the return side, close V-4 and open V-5 and open the manual air vent / purge valve until no more air is released. Both valves V-4 and V-5 can then be opened for normal operation.

If the Loadmatch loop has a significant number of fittings, multiple changes in elevation or is longer than normal (i.e. 30 ft.), additional air vents should be located at the high points to eliminate isolated air pockets.

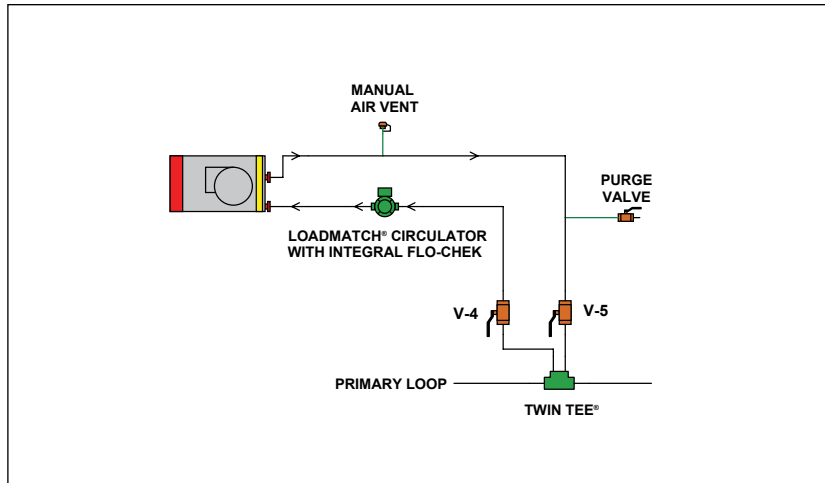


Figure 8

You'll be more comfortable.

LoadMatch® provides better comfort than all air-systems, as well as conventional hydronic systems. LoadMatch® is a self balancing system and assures the required flow to all heating and cooling units at all times. Your heating and air conditioning system will deliver BTU's where they're needed, and when they're needed.

You'll save energy.

With less pipe and the elimination of control valves and most balancing valves, lower pump head and less power is required to move the water.

You'll save money.

Fewer parts, about 40% less pipe and fittings, no control valves and almost no balancing valves reduce first costs. Lower pump head and operation of pumps to match the load reduce operating and maintenance costs. All this adds up to big savings on the system, typically up to 30% of life cycle costs.

Contact Us

Taco engineers are at the forefront of Green Building hydronics, designing components and systems to help you meet the challenges of environmentally sensitive – and budget conscious – design and build. Visit our web site at taco-hvac.com or e-mail greenteam@taco-hvac for more information or to talk to a Taco Green Building professional.

